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ABSTRACT

This chapter considers the social and cultural implications of instructional development, and suggests that the success or failure of a project can best be predicted from improvements in relevant social analysis combined with a competent technical analysis, rather than formal analytic and evaluative analyses alone. Recent developments in the following areas of instructional management are considered: the developer as consultant, identification of the client and the problem, the learner and task analysis, and instructional strategies and evaluation. In summary, it is argued that improvements in the social analysis of instructional development that result in more accurate predictions of success and failure will bring about important changes in the character of professional practice in this field. One table is provided. (54 references) (Author/EW)

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Chapter 5

Instructional Development: The Social Implications of Technical Interventions

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The evolution of ID techniques through the years has been punctuated by an emphasis on scientific analysis and a constant striving for strong theoretical underpinnings. But have we carefully considered the fact that all ID efforts take place in an existing social system and thus all ID efforts are social interventions? What are the implications of the wedding of "social analysis" and "technical analysis" for the future of ID?

SOCIAL ISSUES IN ID

What is instructional development? What do those who use this label actually do? Perhaps an appropriate response is that instructional developers are social activists in scientists' clothing. Developers are almost always about the process of using scientific knowledge to invent pragmatic solutions to instructional problems. These instructional problems have significance for manufacturing plants, colleges, and hospitals alike in that, if left unresolved, they can reduce that organization's effectiveness. In some cases the reduction may be minor, while in others it may be serious enough to threaten the organization's survival.

Our experience* in dealing with such instructional problems suggests that technical responses must be combined with social responses if improvements in performance are to result. The instructional design process compels us to pay attention to the social domain because no change in an individual's behavior leaves the environment unaffected. In addition, elements of the social structure within which instruction occurs mediate our improvement efforts. When members of an organization cannot make group decisions, we must not only try to introduce technical innovations such as agenda setting and concensus building, but must also acquire sufficient knowledge of that group to enable us to combine and incorporate these techniques into a social design that will encourage their use by group members. In this way the practice of instructional development is one of integrated social and technical responses to instructional problems. Thus we become social activists as we serve as instructional technologists.

Changing views concerning job design and the quality of working life provide useful insights into the sociotechnical nature of instructional design. The work of Davis (1977) leads us to see that the hardware and software of any technology are not pre-ordained; both are products of the assumptions about people, machines, and society held by the designers. For example, developers seldom consider that eliminating instruction is sometimes the best way to improve instruction. Replacing the maxim of "technological determinism" with an understanding of the assumptions which drive our practice avoids the trap of the self-fulfilling pro-

*We will use personal pronouns to differentiate assertions based upon our collective experience from conclusions drawn from research.

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phecy, thereby enhancing the possibilities for a realistic solution.

Focusing upon both social and technical elements of an intervention exacerbates the complexity with which developers must deal. Recasting "givens" as assumptions adds to the ambiguity and uncertainty of outcomes as well. This larger model, however, better describes the reality of the contexts within which developers operate, making problem aspects clearer and easier to anticipate.

The developer's practice will often be cast in a pragmatic language of goals, objectives, analyses, instructional strategies, and evaluations. Such language results from an applied scientific orientation focused upon creating reasonably objective descriptions of the causes of and solutions to instructional problems. Our experience suggests that developers analyze problems **logically** using a wide range of research, pose solutions **creatively**, then confirm the effects of their work **scientifically**.This perspective implies a complex professional role that is practiced in a wide variety of organizational contexts, under many different professional rubrics, and with a rich variety of professional styles.

We hope in the next few pages to describe aspects of a process which many developers employ. We will focus upon both technical and social functions which are often included in that process, emphasizing some that we feel have been neglected in past descriptions. Clearly, our view of our profession adopts a more socially-oriented set of assumptions than those of others (Baker and Schutz, 1971; Tracey, 1971; Carey and Briggs, 1977; Dick and Carey, 1978; Goldstein, 1974). In several instances we attempt to make these assumptions explicit.

This article includes a description of several issues that are involved in managing the development process, including a consideration of consulting style. A review of formal analytic functions follows, focusing upon learner and task analysis. The specification of instructional strategies is described briefly. The final section reviews current literature dealing with the evaluation of the products and processes of instructional development.

MANAGING THE DEVELOPMENT PROCESS

The following example may be helpful in illustrating our concept of management. Consider the case of a large commercial firm with manufacturing and sales divisions organized under a single corporate headquarters, which includes a combined organizational and instructional development staff and facility. The vice president for sales calls the development group to arrange a training program for his regional sales managers. He argues, quite strenously, that his managers are not well versed in supervisory or motivational methods. Because his managers are working in a highly competitive and demanding market, he feels that a tailor-made program is required to solve this "training problem." A professional in the instructional development group is assigned to meet with the vice president and assess the potential for building a working relationship.

The Developer as Consultant

How might the instructional developer begin? Perhaps by recognizing that **how** one helps others is as important as the technical procedures used to resolve instructional problems. The consultation process mediates an instructional developer's ability to resolve instructional problems.

This notion requires that we begin to think of the developer as both a helping professional and an instructional technologist. One's professional competence, then, must grow beyond the use of instructional development techniques to include the **planning of social interactions** for benefiting those seeking help. The diffusion literature of the 60s is replete with examples of the social impact of instructional innovations. Anticipation and management of this impact enhances the effectiveness of instructional efforts. Others have recently explored this perspective's value (Blake and Mouton, 1976; Caplan, 1970; Kurpius and Brubaker, 1976; Goodstein, 1978).

A developer has at least three general styles from which to choose when preparing to help others. First, one might respond to a call for help with prescriptions of action believed to result in the elimination or reduction of an instructional difficulty. Many authors label this the prescriptive or "doctor-patient" model. Alternatively, one might accept a client's diagnosis and proposed solution, then provide the required knowledge, skills, or products. This approach is often called the "product" or "purchase" model.

A third approach, outlined by Schein (1969), is particularly attractive to instructional developers. Typically, developers are ignorant of the instructional content relevant to a client's problem. This compels a search for a design process which can resolve the problem and its symptoms. The developer thus chooses to collaborate with a client in an attempt to jointly identify a problem, plan for its resolution, and judge the success of mutual efforts. In this approach, the developer's task is to model a generalizable process, thereby teaching that process to the client. If successful, this collaborative style strengthens the competence of the client as it contributes to the resolution of the problem. It also limits a client's dependence upon a developer's expertise.

The choice of consultation styles is difficult. Certainly the choice should not fall to chance, nor should the developer's preference be the sole criterion. One guide to selecting an appropriate style might be found in the different boundaries that client, consultant, and their respective organizations erect and sustain. These boundaries structure the environment in which the development process is to be used, often constraining the problem-solving behavior of both developer and client. A client's confidence in his own content

expertise, for example, may preclude consultation other than by a collaborative approach.

Rutt (1981) has observed that developers engage in a wide variety of consulting roles across a number of organizational contexts. It would seem that developers intuitively adapt to a complex array of organizational and individual variables in establishing their consulting styles.

Recent Developments

Empirical explorations of the helping process as practiced by instructional developers have yet to form a substantial research area (Durzo, Diamond, and Doughty, 1979). Related inquiry into some of the psychological dimensions of helping and of being helped has been summarized by Lau and Blake (1974), Gergen (1974), and more recently by Bar-Tal (1976). Such research, conducted in settings and under constraints not encountered by developers as they try to assist their clients, seems to offer little direct guidance.

Consulting behavior, nevertheless, is beginning to attract substantive inquiry. Kaplan's (1979) review of situations in which process consultation has been used suggests that it may not always result in client's improved task performance. Porras' (1979) review of several intervention techniques used in educational settings finds them to be less effective than has often been assumed. Such research contributes to the refinement of the developer's helping behavior by suggesting limits within which particular styles and methods are effective.

Who Is the Client?

Having considered how help might be provided, a developer's concern shifts to the determination of just who is to be helped. Those requesting help are not always the most appropriate clients. Our example suggests the vice president to be a sponsor of change which will affect others; he is not the focus of such change (Lippitt and Lippitt, 1978). The regional supervisors, apparently lacking current supervisory and motivational procedures, seem to be the focus of training intended to modify their behavior. They appear to be the legitimate clients with whom the developer should work.

What if the developer were, however, to identify the vice president as the client? Together they might plan a substantial training program employing written materials and other media. Yet little desirable change would likely result. The intervention would have been guided by an individual whose behavior had not resulted in a performance deficiency. The regional supervisors, with their own concept of "the problem," should be directly involved in the design of any change program.

What Is the Problem?

Our example suggests another issue to be resolved once the method and focus of help have been determined. What is the cause of the **performance deficiency**? The vice president defined the cause, or "problem," to be the supervisors' inadequate knowledge of supervisory and motivational practices. Do these perceptions accurately describe the problem, or are they but symptoms of a more deeply-embedded problem?

Making distinctions between symptoms and underlying problems is of critical importance for the success of any instructional development effort. It is frequently difficult to extract such distinctions from a client's perceptions. True problems may be identified from the gaps that exist between valid goals and actual conditions experienced by the client. Valid goals also lead to specific objectives that, if reached, result in goal attainment (Burton and Merrill, 1977; Leitzman and Sisakhti, 1980; Mager, 1970). If symptoms are treated instead of problems, the intervention may well fail to attain the client's goal.

Returning to our example, if the developer had considered the possibility of such underlying problems, those who would directly benefit from behavioral change would have been involved in an effort to estimate conditions as they are and as they could become. The 'real' clients would then have been involved both as collaborators in the intervention's design and as the consumers of the instruction which they designed. This involvement might well lead to the realization that instruction which focused upon changes in the supervisors' behavior would alone prove insufficient to eliminate the problem. A structural change resulting in an **increase** and **refinement** of the organization's **reinforcement** of supervision might also have been required. Providing individuals with the knowledge to attain valid goals might then have meshed with the organization's revised efforts to sustain appropriate behavior. Efforts to modify behavior in or the structure of organizations have been described as comprising organization development (Aplin, 1978; French and Bell, 1978; Schmuck and Miles, 1971). Just as they are not psychotherapists, **instructional developers are not specialists in the complex set of procedures practiced within this area of inquiry.** We argue, however, that developers must have sufficient proficiency to recognize and explore organizationally-moderated constraints acting upon a client's instructional effectiveness. They must be able to view the instructional problem within the context of the entire system of environmental influences upon performance. In this way, developers can work to improve conditions within organizations so as to enhance teaching and learning while reducing organizational variables limiting competent instructional performance.

Recent Developments

We find instructional development to present both developer and client with complex problems. An explicitly negotiated project agreement can

enhance their resolution. Such a document serves both the client and the developer by describing the relationship which they hope to create and sustain as they work to resolve the difficulties before them.

Our agreements include the identification of all persons who are to be actively concerned with the development effort, their roles, the goals they hope to attain, and the specific objectives to be reached in pursuit of these goals. These agreements also indicate the resources to be acquired and how they are to be used. The administrative procedures to be used in managing the developer-client relationship, an indication of the evaluation procedures to be used, and the method for renegotiating elements of the agreement are also specified. We do not view such agreements as legal documents, but rather as a way of organizing both social and technical concerns through a single process that facilitates continuing mutual understanding.

The nature of the client-developer interaction, the nature of the problem, and especially the resources to be gathered and applied to that problem (Milstein and Smith, 1979) are renegotiated as necessary. This flexible redefinition of elements and functions in the development process encourages a search for feasible social and technical solutions. Our discussion has excluded important considerations such as cost-effectiveness estimates and time-management procedures. Doughty's (1979) recent review of such issues may prove helpful. Our exploration of the relationship between needs, goals, problems, and symptoms is treated in greater detail by Kaufman and English (1979). There are few reports on the design and use of development agreements, an emerging element of the instructional development process (Leitzman, Walter, Earle and Myers, 1980).

FORMAL ANALYSIS: LEARNERS AND TASKS

Analysis functions include the formal, theoretically-based, restructuring of an instructional problem in terms of a learning, instructional, or related social-science theory. In Table 5-1, the typical states of formal analysis, with corresponding examples from Gagne's (1977) instructional theory, are listed.

Gagne's theory is one of the first to significantly influence the practice of development. It is an excellent example of an applied form of scientific behavioral analysis. However, in recent years a number of alternate formal models have emerged. The developer now has a number of models from which to choose when resolving an instructional problem.

As noted, developers are not in complete agreement in describing the superordinate functions of instructional development. Many developers view task analysis as their primary function, while others include learner analysis as a separate and equal function. We hold the latter position.

Learner Analysis

Glaser (1973) and Schwenn (1973) have argued that there are three basic approaches or models in learner analysis which closely parallel three fundamental viewpoints in psychology: individual difference theory, behaviorism and cognitive psychology. Following these viewpoints, learner analysis may be described in terms of selection, pre-knowledge and aptitude-treatment models. The selection model will be familiar to readers who have encountered entrance exams for admission to educational institutions or tests for personnel placement. The pre-knowledge model, most commonly used by developers, involves the diagnostic assessment of entry behavior and subsequent placement of students in an instructional setting following the analysis of learning tasks. The aptitude-treatment model suggests that two or more instructional strategies may be differentially effective across the range of an aptitude measure. Students could then be taught using a strategy that is best suited

Table 5-1.

Steps in Analysis	Examples following Gagne (1977)
1. The creation of a new simplified problem statement	Students are to apply the rule------in solving math problems of the form----
2. A restructuring of the problem in its component parts	The prerequisite behaviors are delineated
3. A new model is created	A hierarchy of the learning task is defined
4. The model is tested against reality	The hierarchy is validated
5. The implications of the new model are stated	Learning conditions are specified

to their aptitudes. Developers using this model try to create "different instructional strokes for different folks." Unfortunately, the aptitude-treatment model is as yet seldom used because its underlying theory is not sufficiently developed to reliably suggest its successful application.

Interestingly, each of the learner analysis models reduce student failure if successfully applied. In selection analysis those who have a predetermined probability of failing are excluded from instruction. The person is matched to the task. In pre-knowledge analysis, failure is reduced because the learner begins a task at a level matched to his level of performance or understanding. The task is adapted to the learners. In aptitude-treatment analysis, aptitudes and cognitive processes inherent in the treatment are simultaneously analyzed so that learners are assigned to optimal educational treatments. Both the task and the learner undergo adaptation.

Although each of the three learner analysis approaches can result in reduced student failure, the social consequences of employing the three methods are dramatically different. In the selection paradigm we include only those learners (as measured by "relevant aptitudes") who have a high probability of success. Failure is in the form of students excluded from the instructional system. The social costs here can be considerable. Most readers are aware of the social controversy that results. Our cognitive-aptitude tests are substantially influenced by the cultural content from which they were derived. Therefore, the tests serve as class barriers to entry into those instructional systems that use them. However, when the systems accomodate this problem and create separate sets of prediction equations for minorities, there are members of the majority who are excluded, but who would have been included without the special affirmative-action process. In addition to these social problems, there are others. Typically the use of such a system coincides with an aura of elitism around those who are admitted. A peculiar form of Social Darwinism prevails. This state of affairs is ironic if not tragic for those excluded when the prediction technology is moderately unreliable, socially biased, based upon invalid instruments, or poorly managed. In many cases the "less capable" or "no more capable" are admitted to instructional systems at great social costs to the institution, to those admitted and to those rejected. For example, many medical, dental and other health-related fields are finding the integrity and technical competence of successive graduating classes are declining for a variety of reasons, including: 1) science and math grades have been obtained fraudulently, 2) science and math aptitude is independent of social sensitivity or concern, 3) the science and math measurement devices are in part socially biased, and 4) the science and math predictors are not well linked to the criterion of a successful physician or dentist.

Social problems are not peculiar to selection technology, however. There are also social implications for a system of pre-knowledge analysis. Some learners simply learn some content more slowly than do others. In an expensive instructional system such as a medical school, the social costs would be substantial, because "slower" learners would prevent "faster" learners from occupying their student positions. Some "slower" learners would conceivably take two or three times longer to complete a "mastery-oriented program." Also, pre-knowledge programs are typically individually paced, sequenced in a linear pattern and devoid of social interactions. These strategies are not necessarily consistent with producing creative, social or divergent understandings, or for teaching learners who have strong preferences for other forms of learning. Most developers have had at least one experience with the social consequences of advocating a form of analysis or a strategy that is widely variant from the norms of the instructional system or students' styles. The consequences are typically painful whether or not the advice is accepted.

Although aptitude-treatment technology is still underdeveloped, some social consequences have been anticipated there as well. Messick (1973) has observed that consistently-differentiated treatments which would capitalize only on the explicit, obvious outcomes of instruction would be too focused or narrow. Students would not have an opportunity to remedy deficiencies built into the treatment, thereby restricting their development. Also, the cost of differentiated treatments on a large scale for numerous segments of the instructional community would dramatically increase our instructional costs.

The point of all this is that the social consequences of our technologies evolve from fundamental assumptions about learning and individual differences. It is important to recognize the social implications which are embedded in our choice of technical tools. We must trade off technical and social effectiveness with precision if we are to avoid doing serious harm to our clients and decreasing effectiveness. We may finally have arrived as a profession when we realize that our tools have as much potential for harm as they have potential for good.

Recent Developments

Selection analysis is best described in the personnel field's literature. The Handbook of Industrial and Organizational Psychology, edited by Dunnette (1976), is a useful introductory reference.

Many recent developments in pre-knowledge analysis concern criterion-referenced testing. Fundamental psychometric problems involved in making individual placement decisions with a limited number of diagnostic test items have spurred this interest. Popham (1978 a, b) summarized the debate concerning this form of testing in a recent issue of Educational Researcher.

Aptitude-treatment interaction research and

analysis is presently an active area of inquiry (Cronbach and Snow, 1977). Snow (1977) has recommended the use of several aptitude constructs and related measures as a routine part of most development projects. The constructs which seem to contribute most reliably to aptitude-treatment interactions are achievement motivation, anxiety, and crystalized, fluid, and visual intelligence.

Task Analysis

Analysis of the goals of instruction, including the specification of performance criteria, is almost always a basic function of instructional development. The analysis provides appropriately detailed information for the subsequent design of instruction and evaluation. The tasks so specified are usually jobs, parts of a job, or intellectual tasks in which a student is expected to have demonstrated proficiency upon completion of the relevant segment of instruction. The emphasis in the analysis is upon describing the actual requirements and structure of the task. Frequently, this description is at variance with the established "expert's" account.

Gibbons (1977) classified twenty-five different task-analysis procedures according to the characteristics of the task to be analyzed and the phase of the analysis process at which each procedure is applicable, ranging from the preliminary needs assessment through the most detailed content specification. Additionally, these techniques vary in the way in which they display their results and in the assumptions one makes about the ensuing instructional design and evaluation. Practicing developers typically choose from among the available techniques based upon a combination of pragmatic and theoretical considerations. For the purpose of examining social consequences, learner- and task-analysis models are interrelated. Behavioral models can be linked to pre-knowledge models and consequences. Information-processing models are often used in aptitude-treatment analysis. These techniques also vary in their suitability for different developer/client relationships, and in their costs and benefits for the project-setting at hand.

Recent Developments

The most recently developed task-analysis techniques exemplify more comprehensive analysis; attention to the underlying structure and processes of learning tasks; improved integration of task analysis with specification of training requirements, job design, instructional design and evaluation prescriptions; and improved precision of analysis.

Expanded comprehensiveness is apparent in many modifications of classical behavioral analysis techniques. In content analysis, many modifications have been proposed to Bloom's taxonomic structure of objectives (Bloom, 1956; Krathwohl, Bloom and Masia, 1964). Williams (1977) has proposed an alternative structure for the Cognitive Domain and reports improved facility in designing instruction across the entire range of cognitive tasks. Foshay (1978) has argued that the usual three-domain (Cognitive, Psychomotor, Affective) analysis of learning experiences is incomplete and that increased precision can be obtained by replacing the affective domain with four others (Social, Emotional, Aesthetic, Spiritual). In job analysis, a comparable refinement of behaviorally-based taxonomies is apparent in the techniques reviewed by McCormick (1976). In both the content-based and job-based techniques, the stated advantage of the more complete and detailed taxonomies is the systematic identification of a wide variety of factors which can influence the efficiency and effectiveness of instruction and evaluation.

Attention to the structure underlying the subject matter (content) to be learned is a second trend. In approaches exemplifying this, emphasis is upon teasing out the attributes of the concepts to be acquired, the structure/process relationships among them, or both. Analysis of the task by means of behavioral objectives, then, is done as a second phase (if at all) in order to assist in operationalizing instruction in, and evaluating acquisition of, this structure.

Perhaps the most widely applied structural-analysis technology is concept analysis (Tieman and Markle, 1978). In this approach, content is analyzed into its component chains and concepts. The critical and variable attributes of each concept are identified, and the hierarchical relationships among concepts are specified (the hierarchies are not comparable to Gagne's (1977), however). Instruction is then, by means of a series of concept-acquisition tasks, based upon specified design principles.

A system for more complex analysis of concepts has recently been described by Merrill, Reigeluth, and Faust (1979). In this technology, content is analyzed into its component facts, concepts, procedures, and principles. It is argued that five levels of learning task apply to concept acquisition. Crossed with the four types of content, a matrix results which is then used as a guide for the complete task analysis and the detailed design of instructional treatments and evaluation procedures.

A more radical alternative for analysis based upon a particular information-processing theory of cognitive psychology is advocated by Scandura (1977). He maintains that content can most appropriately be represented as a hierarchical structure of rules, and that learning is essentially the acquisition of higher-order rules, which in turn structure rules already learned so that they may be assembled to guide actions toward a given goal. In performing his analyses, Scandura explicitly stays within the known capabilities of human information processors. From a different perspective, attention to structure/process relationships has also been apparent in the application of systems analysis to work organizations. For example, Stephens

(Wood, Stephens, and Barker, 1979) has adapted Fault-Tree Analysis to the improvement of organizational effectiveness.

Improved integration of the product of the analysis with the subsequent design of instruction and evaluation is a third trend. Particularly in the work of Markle (1969), Merrill et al. (1979), and Scandura (1977), explicit theory-based attempts have been made to tie task analyses to prescriptions for instructional treatments. Integration has also improved in job analysis (Holden and Lescop, 1978). As integration improves, the need for the developers to make an intuitive leap from task analysis to the reality of the instruction or training settings is reduced.

Finally, a trend toward increased analytic precision can be noted among these new techniques. For example, the structure/process techniques enable the developer to pay close attention to the acquisition of concepts by the learner, to interpret errors made and to adapt instruction appropriately. However, only as data become available from the applications of these technologies to a variety of instructional problems will it be possible to demonstrate that the precision thus gained is not false, and that the efficiency and effectiveness of instruction can be improved in this way.

The potential power of these techniques, however, also carries implications for the developer/client relationship. Our experience suggests that developers must match task-analysis strategies to client characteristics as carefully as to the requirements of the instructional design and evaluation processes. Task analysis is by its nature a collaborative effort between the developer and the client or subject-matter expert (SME). Consequently, it frequently provides an occasion for improving the client's sophistication about the entire ID process. Thus, the developer must select analysis techniques which can be used appropriately for client development, which will foster clear communication among those involved in the project, and which will be effective with the given project resources and within its constraints. These selection criteria are in addition to the more clearly-defined need for interface of task analysis with the information requirements of particular instruction and evaluation strategies.

SPECIFYING INSTRUCTIONAL STRATEGIES

We have noted that creating instructional strategies is often an intuitive process. Many authors have discussed this state of affairs as a serious problem (Baker, 1973; Carey and Briggs, 1977). If one assumes that development is in essence an applied science, this state of affairs certainly poses a problem. If, however, one assumes that development is a complex role which legitimately includes both scientific and intuitive problem-solving, then it is possible to take an alternate view. Our position is that it would be better to develop strategies from our analyses. Unfortunately, intuitive or creative problem-solving will be required until the models of formal analysis are sufficient to deal with the complex reality in which we define problems.

We see theoretical promise in the work of Salomon (1979), Levie and Dickie (1973) and cognitive psychologists such as Klahr (1976) and Scandura (1977). These and other authors have begun to define treatments in terms of the psychological functions they elicit in the learner. Salomon, for example, defines treatments in terms of their potential to cultivate, activate, or supplant specific intellectual functions. Merrill, et al., (1979) and Boutwell (1978) have developed a scientific motivation system which attempts to identify or code the teaching process in an elaboration of the rule-example coding of programmed-instruction literature.

These mechanisms and others like them are certainly not definitive. We expect that a generation or more will be required before strategy-building will proceed from a completely scientific basis.

Given this state of affairs, we often manage our strategy-building activities after the models for fostering creativity (DeBono, 1971; Koberg and Boynall, 1972). Small-group processes such as brainstorming, devices for breaking set, etc., are used. We also invest a great deal of energy and resources seeking comparable solutions to problems. In this type of activity the knowledge gained from formal analysis becomes a preliminary phase in defining the problem. The creative problem-solving processes which follow result in the complete instructional plan. We also find our clients' participation in these activities results in a more complete ownership of the solution by the client system.

Strategies

Social implications do follow from the choice of analysis models. For example, it was noted above that behaviorally-oriented, pre-knowledge systems tend to utilize individually-oriented, linearly-sequenced instruction. Therefore, the social consequences of learner and task analysis tend to be carried out in specifying learning strategies. The art of trading off social and technical consequences of strategies can be practiced in the design of strategies, however. For example, it is possible to envision a mastery oriented pre-knowledge instructional system that is managed by small groups of learners who manage themselves in the choice of materials and experiences designed to enhance their creative skills. This hypothetical hybrid "trades off" the strengths and weaknesses discussed previously. This trade-off may only result from a social and technical analysis.

EVALUATION

Evaluation is **not** the last step in the development process, as one might mistakenly infer from

the countless flowcharts depicting development models. Indeed, formative evaluation should happen concurrently with **all** activities in that process. The image of the evaluator is beginning to change as a logical result of this more intensive view of evaluation. No longer only detached, dispassionate observers aloof from the development of an instructional program, evaluators are becoming involved with the program their assessments shape. Evaluators are thus forging increasingly instrumental roles which contribute to a program's definition and implementation (Morris and Fitz-Gibbon, 1978a).

Virtually all functions of the systematic design process we have described can be evaluated. For example, the implementation of a development project's instructional design can be evaluated on three different levels. First, the prototype materials can be judged informally using expert opinion and by observing and collecting information from small groups of typical learners. On the second level, a refined prototype can be implemented on a "pilot" level while formative evaluation data is collected describing its use and effects. Finally, a third level allows for the fully-implemented program to be monitored so as to ensure consistency between intended and actual procedures. The first two of these levels have long been considered part of formative evaluation in instructional development (Baker and Schutz, 1971; Gagne and Briggs, 1974; Markle, 1969). Unfortunately, the third level, critically important in determining a program's success or failure, has too often been neglected despite the existence of an appropriate technology (Morris and Fitz-Gibbon, 1978b).

The evaluation function can itself be assessed. This intriguing possibility, termed "meta" evaluation by Scriven (1972) is becoming increasingly common. Such evaluations of evaluation efforts should be planned to occur simultaneously with a program's evaluation rather than conceived after the fact. Gregory (1974) provides an example of a well-conducted meta-evaluation.

Evaluation contributes to our work in two important ways. It offers us information about the **processes** we use to design, implement, and assess an instructional program. Evaluation can also provide us with estimates of that program's **outcomes.** While assessment of outcomes is a well-established activity, the evaluation of development processes is seldom given the attention it deserves. More effort in this area would likely result in better procedures and in an increased sharing of them among instructional developers.

Recent Developments

The traditional methods of evaluation, be it formative, summative, or confirmative evaluation, derive from achievement testing, psychometry, inferential statistics, and experimental, quasi-experimental, and correlational researh designs. Increasingly, however, there is a movement away from the "if-it-can't-be-measured-it-doesn't-exist" stance that has sometimes characterized those fields. An increasing number of qualitative tools are joining the conventional quantitative measures available to the formative evaluator. Concern for the ecological setting in which evaluation is carried out (Bronfenbrenner, 1976; Cronbach, 1975; Shrock, 1977) has provided a thrust for the development of such new evaluation technologies. Notable among these for its utility to instructional developers and formative evaluators is naturalistic inquiry (Guba and Lincoln, in press).

Concomitantly, the informality that has characterized formative evaluation (Gagne and Briggs, 1974) is gradually giving way to increased rigor, especially in the pilot and implementation stages.

The technology of summative evaluation has also been subject to expansion as new paradigms are explored. The progress of such concepts as transactional evaluation (Rippey, 1973), goal-free evaluation (Scriven, 1973), adversary evaluation (Levine, 1973; Owens, 1973), and a number of metaphors--poetic and musical criticism (Della-Piana, 1979a, 1979b), investigative journalism (Guba, 1979a), and others--should be monitored by instructional developers and formative evaluators, since intention to apply them in the summative evaluation of projects could have important consequences for the development and formative evaluation of these projects.

While the social implications of these advances in technology are interesting and manifold, space prohibits the exploration of more than a few illustrations. A shift from quantitative to qualitative methods and from "objective" to "subjective" instrumentation, for example, means that students in the program whose design is being evaluated are less likely to be subjected to the behavioral objectives-oriented, pencil-and-paper type of testing that has often characterized evaluation in the past. Many evaluators have long suspected that evaluations using the typical instrumentation have often failed to get to the heart of a program. Perhaps, as Guba (1979b) suggests, this movement will see the replacement of pencil-and-paper instruments with instruments that are potentially more comprehensive: human beings.

The increased rigor of the procedures being applied to developmental stages will mean that students should be exposed to more "bug-free" programs, which took less time (and therefore, cost) to develop, than previously.

Finally, the social implications of changes in the technology of summative evaluation are legion, for both the developers and the students. For example, the stoicism of a developer who holds sacred the behavioral objective would be sorely tested by a summative evaluator who plans a goal-free orientation, and says, in effect, "Don't tell me what your objectives are. I don't want to be 'contaminated' by knowing them. I'll just go out there and find out what your program is doing, then you can tell me whether or not that's what you wanted it to do."

SUMMARY

We have argued that questions surrounding the management of the development process have critical importance for the successful practice of instructional development. Additionally, we have identified the formal analysis of learners and tasks, the specification of instructional strategies, and evaluation as important functions within that systematic design process. Finally, we have included brief reviews of developing trends for each of these four functions.

Our view of instructional development deliberately emphasized the social aspects of that systematic design process. Our experience suggests that improvements in relevant social analysis, when combined with competently-applied technical analysis, can result in more accurate predictions of success or failure than can formal analytic or evaluative procedures alone. Consequently, we see the role and definition of instructional development dramatically changing in the next few years. We expect the continuing pursuit of social analysis to change the character of professional practice--our self-concept, our influence and our institutional identity. We have argued that the "developer scientist" has no clothing unless he has an awareness of the social implications of his technical analyses.

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